

Operation Manual

Model 491

***Electronic Preservative Applicator
For Large Square Balers***



HarvestTec®

EST. 1976

Harvest Tec Model 491 Operation Table of Contents

	<u>Page</u>
Introduction	3
Safety	3-5
Safety Decals	4
Safety Location	5
Preparing the applicator for operation	6-7
Filling the tank	6
Operation of the main ball valve	6
Power harness connection	7
Operation of the control	7
Understanding and using the control	7
Message light	7
First time and annual start up	8
Field operation	8-10
Calibration	8-9
Determining tons per hour for large square balers	8
Determining the rate of chemical	9
Selecting tips and setting pressure	9
General calibration application chart	10
Maintenance	11-12
Maintenance schedule	11
Filter bowl cleaning	11
Miscellaneous maintenance	11
Tip & tip screen cleaning	12
Tank lid cleaning	12
Dielectric grease connections	12
Rebuilding pump	12
Battery connection	12
Winter storage	12
Troubleshooting	13
Warranty Statement	14

Introduction

Congratulations and thank you for purchasing a Harvest Tec Electronic Preservative Applicator system. Read this manual carefully to ensure correct steps are followed to attach the applicator to the baler. This applicator is designed to apply Harvest Tec buffered propionic acid. **Use of alternative products may cause complications and voids warranty.** Complications may include inaccurate readings from the pressure gauge and damage to system components. This applicator allows the operator to adjust the rate of preservative while baling for changing moisture and baler throughput field conditions.

Electronic Preservative Applicator systems are compatible with Optional Crop Eye Forage Indicator kit 474A which are designed to pause and restart the spray pump based on forage intake at the baler pickup. Use of crop eyes will assist in the conservation of chemical when tying bales and when at the end of wind rows.

This operations manual includes the steps to properly run the applicator and advises of safety precautions. Read this manual carefully to learn how to operate the equipment correctly. Failure to do so can result in personal injury or equipment malfunction. If you are unsure about operating the system after consulting this manual, contact your local authorized dealership for additional assistance. If you are in need of parts for the system please see the parts breakdown in the installation manual and contact your local authorized dealer or Harvest Tec directly to order parts.

Right and Left sides are determined by facing in the direction of forward travel.

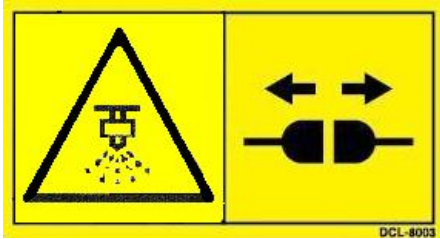
Safety

Carefully read all the safety information and decals in this manual and on the applicator before use. Keep signs clean and in good working order. Replace missing or damaged safety signs. Replacement signs are available from your local authorized dealer. See your installation manual for the correct replacement part numbers.

Keep your applicator in proper working condition. Unauthorized modifications to the applicator may impair the function and/or safety of the machine.

Carefully read and understand all of the baler safety signs before installing or servicing the baler. Always use the supplied safety equipment on the baler to service the applicator.

Safety Decals



Number 1
Spraying hazard. Disconnect power before servicing the applicator
Part no. DCL-8003



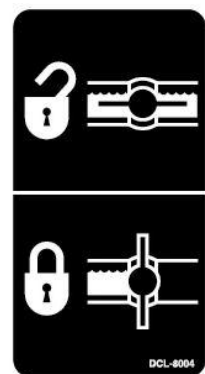
Number 2
Falling hazard. Do not step in this area.
Part no. DCL-8002



Number 3
Use caution when working around chemicals. **Wear all protective equipment according to the label of the product.**
Part no. DCL-8001



Number 4
Read and understand the operator's manual before using or working around the equipment.
Part no. DCL-8000



Number 5
Open (unlocked) and closed (locked) position of the ball valve.
Part no. DCL-8004

Safety Decal Locations



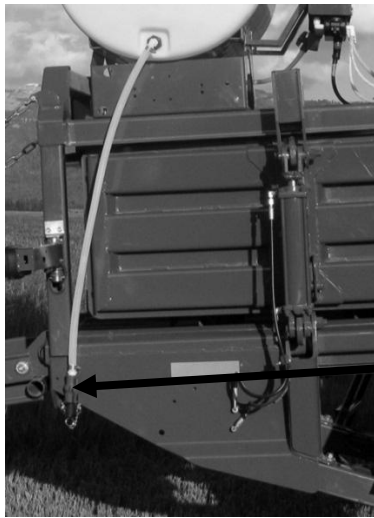
Preparing the Applicator for Operation

After the Applicator has been installed on the baler, follow the below steps to prepare for operating the applicator both safely and correctly.

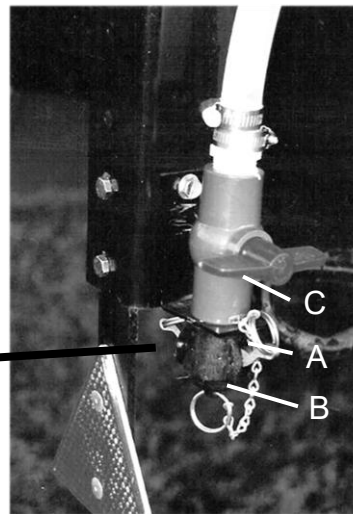
Filling the Tank

Read the label of the product being filled into the tank to determine what individual protective measures need to be taken. Locate the drain/fill line on the baler. Open the cam-couplers (A) and remove the protective plug (B). Insert the male coupler (found on transfer pump) into the female cam and close the cams (A). To open the ball valve (C) turn the handle so it is vertical. After the ball valve has been turned on switch the pump to the On position. Monitor the level on the tank visually and shut off the pump before over filling. Once the pump is turned off, close the ball valve and remove the male coupler. The handle of the ball valve (C) will be horizontal when closed. Reinstall the protective plug and close the cams. A Harvest Tec transfer pump kit (9212, 9214 or 9215) is recommended for this process and available in 12v and 110v versions. Call your authorized dealer or Harvest Tec directly for pricing and availability.

Water is recommended for first time and annual start up procedures.



Drain/Fill line on the baler

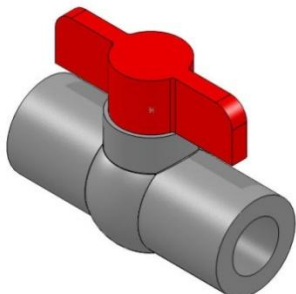


Enlarged view of the drain/fill line valve and cam-coupler assembly.

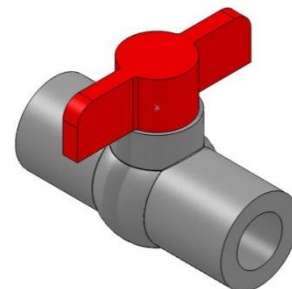
Main Ball Valve Operation

The ball valve should be closed at all times when the applicator is not being used. The valve should also be closed when any service work is being done to the baler or applicator.

The valve is located next to the pump and by the applicator tank. The arrow below points at the valve.



Valve open



Valve closed

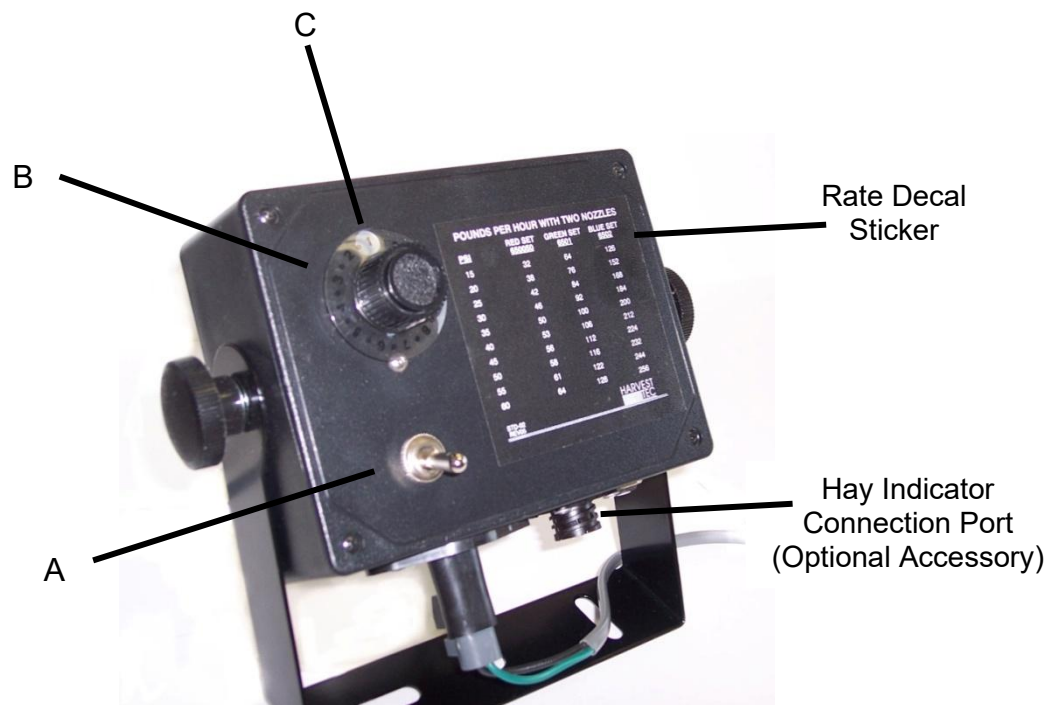
Power Harness Connection

The power harness that supplies power from the tractor battery to the applicator pump has a disconnect at the hitch. Connect the two together for operation. Always disconnect before servicing the applicator or baler.

Operation of the Control – 457 Control Box

Understanding and Using the 457 Control Box

The model 457 control is pictured below. The toggle switch (A) is used to supply and cut off power to the pump. With the switch in down (shown) the pump power is off. Lift the switch up to supply power. The dial (B) is used to adjust the pressure to the tips when the pump is running. The numbers on the dial are to be used only as a general reference. The PSI indicated on the system gauge determines the exact flow. Apply the rate decal sticker (included with applicator kit) to the front of the control box. The message light (C) will always be illuminated when the power is on. If the light ever blinks during operation please reference the “Message Light” section below.



Message Light

The LED under the speed dial will be illuminated when the applicator is running under normal situations. If the light blinks on and off while in use, see the information below to interpret the message.

Slow steady on and off blink: The system is attached to Crop Eye Hay Indicators (474A) or a foot switch is activated. This message means that the pump is being paused. Light will turn to constant once the baler is back in the windrow and hay indicators are no longer pausing the pump.

Two quick blinks: The pump motor or pump harness is shorted.

Three quick blinks: Pump motor is over the current limit (10 amps).

Four quick blinks: Power is under current from a bad connection.

Control box must have the on/off switch toggled to clear the message after the fault has been fixed to clear.

First Time and Annual Start Up

Fill the tank with 5 gallons of water. Turn on the power to the system by pushing the toggle switch up. There may be a slight buzzing of the control box motor that is heard- this is normal. Turn the dial on the control box until the pressure gauge starts to climb. Turning the dial clockwise will increase pressure. Turning the dial counterclockwise will decrease pressure. With the applicator spraying at about 30 PSI, check for leaks at all fittings and hose connections. Once comfortable with the operation of the controls, the applicator can be manually adjusted by the operator to apply the desired amount of chemical to be applied.

Field Operation

Calibration

There are three things needed to be known when calibrating your applicator.

- (A) Tons per hour being baled.
- (B) Application rate, or how many pounds of product needed to apply for a given ton per hour.
- (C) Which tips to use and at what pressure to set the gauge.

A. Determining Tons per Hour: for Large Square Balers

- 1. Time how long it takes to make a bale.
- 2. Weigh several bales to determine/estimate the average bale weight.
- 3. Use the Bale Rate Chart below to determine the tons you are baling per hour.

Example: You are baling 1000-pound bales, with 2 minutes of time per bale. Looking at the chart below, your tons per hour is 14.

Large Square Bale Rate Chart (tons per hour)

Weight per bale

Average time to make a bale	600	800	1000	1200	1400	1600	1800	2000
1.0 MN	18	24	30	36	42	48	54	60
1.5 MN	12	16	20	24	28	32	36	40
2.0 MN	9	12	14	18	21	24	27	30
2.5 MN	7	10	12	14	17	19	22	25
3.0 MN	6	8	10	12	14	16	18	20
4.0 MN	5	6	8	9	10	12	14	16
5.0 MN	4	5	6	7	8	9	11	13
6.0 MN	3	4	5	6	7	8	9	10
8.0 MN	3	3	4	5	5	6	7	8
10.0 MN	2	3	3	4	4	5	6	7

B. Determine the Rate of Chemical

The number of pounds of chemical required to be applied to a given ton of hay, depends on the moisture and the type of chemical used. The moisture of the hay is important in determining how much chemical to use. By knowing the moisture, you can make sure you are treating the hay correctly. Under applying will save money but spoilage most likely occurs. Over applying will waste money however, the hay will be saved. Some chemicals require more or less to treat the same amount of hay. To find the exact number of pounds required, for a given hay moisture, refer to the label on the drum or contact the manufacture. Harvest Tec applicators come with a set of low, medium, and high tips. If your chemical requires rates other than what these tips deliver you will need to purchase them through your dealer.

C. Selecting Tips and Setting Pressure

Once you have determined your tons per hour and the amount of chemical needed for the moisture you are applying at, you can select your tips and determine your gauge settings.

1. Multiply the tons per hour by the amount of chemical required for the moisture you are applying at. This sum will give you the application rate.
2. Select the proper set of tips from the application rate chart and install them.
3. For the tips you have selected, you will need to keep the gauge at the recommended PSI to achieve the proper application rate.
4. Set the pressure by adjusting the dial on the control box and by reading the pressure of the gauge to match the desired rates. The numbers on the dial are for reference only. Rate is determined by watching the pressure gauge.

Example: You are baling at 12 tons per hour with your large square baler. The moisture that you are baling at requires you to apply 6 pounds per ton. Multiply the 12 tons x 6lbs = 72 lbs per hour. Using the chart on page 28 you will notice the orange set of tips at 20 PSI will give you that output.

Caution: Gauges can be damaged by over-pressurization

Gauges failing to read below 10 PSI when disconnected from system (or system has not been used for 10+ hours) have been over pressurized. Once this has happened, gauge internals are damaged and unit will no longer read correctly. Damaged gauges will need to be replaced, they cannot be repaired.

Possible causes of gauge over-pressurization

- Turning the system on when tips are plugged; Make sure tips are clean before turning on the system.
- Using too small of tips for the application rate that is needed; Be sure to calibrate the system using the correct tips to account for the tonnage and desired application rates that will be used during baling.

General Calibration Application Charts

Pounds per Hour with Two Nozzles

Included w/ Applicator Kit					
Tip Set:	YELLOW SET	ORANGE SET	GREEN SET	BLUE SET	BROWN SET
	800067PT or T800067-SS	TT11001VP or T8001-PT	TT10015VP or T80015-PT	TT11003VP or T8003-PT	TT11005VP or T8005-PT
PSI					
15	42	64	95	196	323
20	49	74	111	222	376
25	53	80	122	249	413
30	60	90	138	275	461
35	65	98	148	296	
40	70	106	159	317	
45	74	111	170	336	
50	78	117	180	354	
55	81	122	188	370	
60	85	127	196	386	

Gallons per Hour with Two Nozzles

Included w/ Applicator Kit					
Tip Set:	YELLOW SET	ORANGE SET	GREEN SET	BLUE SET	BROWN SET
	800067PT or T800067-SS	TT11001VP or T8001-PT	TT10015VP or T80015-PT	TT11003VP or T8003-PT	TT11005VP or T8005-PT
PSI					
15	5.2	7.3	10.7	22.0	31.9
20	5.6	8.4	12.7	24.1	42.2
25	6.3	9.5	14.1	28.3	47.3
30	7.0	10.3	15.5	31.0	52.2
35	7.5	11.3	16.6	33.5	
40	8.0	12.2	17.8	36.0	
45	8.4	12.6	19.2	38.3	
50	8.9	13.2	20.6	40.7	
55	9.3	13.8	21.3	42.5	
60	9.7	14.4	22.0	44.4	

ONLY THE OPERATOR CAN DETERMINE HOW MUCH PRODUCT IS APPLIED

Maintenance

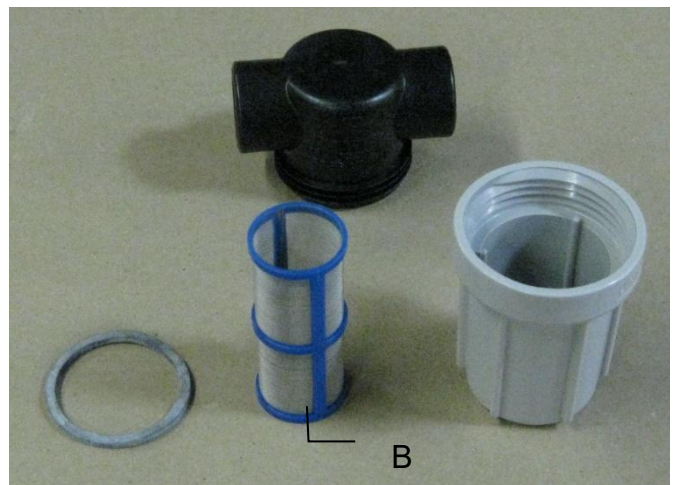
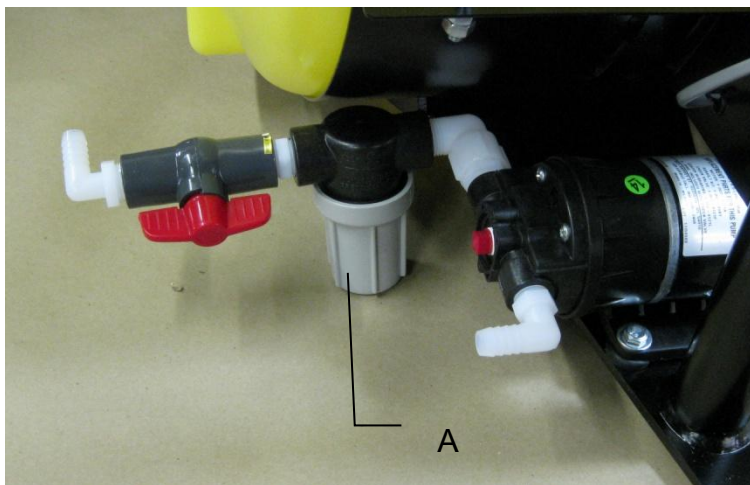
- If you are unsure how to perform any of the maintenance steps have your local authorized dealer perform the tasks.

Maintenance Schedule:

	Daily	10 hrs	400 hrs	Weekly	Monthly	Season
Filter bowl cleaning		X				X
Tips & tip screen cleaning		X				X
Tank lid cleaning		X				X
Dielectric grease connections					X	X
Rebuild pump			X			
Battery connections				X		X
Visually inspect hoses				X		X

Filter bowl cleaning: Before cleaning the filter bowl all personal protective equipment must be worn (Face shield or goggles, chemically resistant apron, boots, and gloves).

Verify that the ball valve located next to the pump is turned off. Locate the filter bowl on the side of the pump manifold (A). Unscrew the bottom section of the filter bowl and remove the strainer (B). Clean off any debris and soak in warm water with a mild soap if necessary. Once the screen is clean reinstall by following the directions in reverse.



Miscellaneous maintenance:

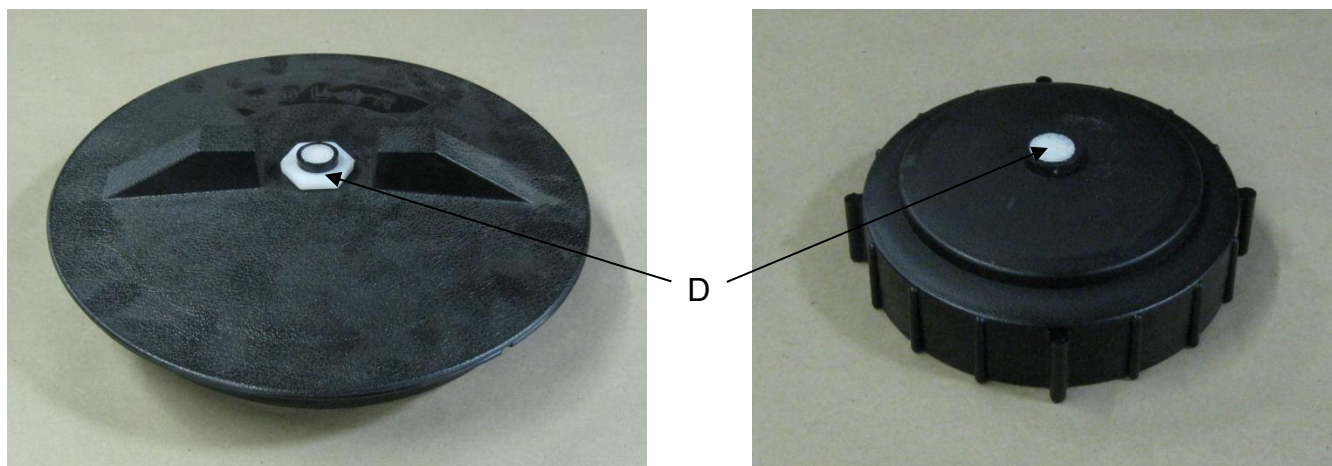
1. Depending on the product being used, the system may need to be flushed with water at a regular interval (consult with manufacturer of the chemical). If Harvest Tec product is being used, flushing is not necessary.
2. Although the pump can run dry, extended operation of a dry pump will increase wear. Watch the preservative level in the tank.
3. If you are using bacterial inoculants, flush your system daily after every use.

Tips & tip screen cleaning: Before cleaning the tips and screens all personal protective equipment must be worn (Face shield or goggles, chemically resistant apron, boots, and gloves).

Verify that the ball valve located next to the pump is turned off. Disconnect spray shield from hangers if possible or remove tips in place. Remove the tip, and screen. Some models may require a wrench to remove. Clean off any debris and soak tip and screen in warm water with a mild soap if necessary. Once the tips and screens are cleaned reinstall by following the directions in reverse.

Tank lid cleaning: Before cleaning the tank lid all personal protective equipment must be worn (Face shield or goggles, chemically resistant apron, boots, and gloves).

The tank lid is located on the top of the tank. Use the supplied handle on the tank to secure your person and use the other hand to remove any debris from the top of the tank. Unscrew the tank lid and bring down ground level. Use compressed air clean out the tank screen (D). If the screen cannot be thoroughly cleaned with compressed air, replace fitting (005-9022B3). Once the screen is cleaned reinstall the cover.



Dielectric grease connections: Disconnect all harnesses on the applicator, clean the connections, and repack with dielectric grease.

Rebuild pump: If the pump is not working up to specifications a pump rebuild kit may fix the problems. Verify that the ball valve is turned off. Before working around the pump all personal protective equipment must be worn (Face shield or goggles, chemically resistant apron, boots, and gloves). Disconnect all pump fittings and remove pump from saddle. Follow rebuild instructions supplied with pump rebuild kit. Reinstall after rebuild is complete.

Battery connections: Follow the batteries safety warnings and clean the battery connections. If the connections cannot be cleaned, replace harness.

Winter Storage:

1. Thoroughly flush the system with water.
2. Remove the filter bowl and run dry until the water has cleared out of the intake side.
3. Remove the red plug from the bottom of pump, drain, and run the pump for 30 seconds or until dry.
4. Drain all lines on the outlet side.
5. Never use oils or alcohol based anti-freeze in the system.
6. For spring start-up, if the pump is frozen, turn off the power immediately to avoid burning the motor out or blowing a fuse. The pump head can be disassembled and freed or rebuilt in most cases. Check the fuses after the pump has been freed.
7. Disconnect power from the applicator
8. Remove display from tractor and store in a warm, dry place.

Troubleshooting

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>SOLUTION</u>
Pump will not run.	1. Circuit breaker tripped on electronic unit.	1. Check for short, low voltage, and reset breaker.
	2. Pump locked up.	2. Clean or rebuild pump.
	3. Damaged wire.	3. Repair damaged wire.
	4. Vapor locked.	4. Loosen hose by check valve at gauge and bleed air.
Pump runs but will not prime.	1. Air leak in intake.	1. Tighten fittings on intake side.
	2. Clogged intake.	2. Clean.
	3. Restricted outlet.	3. Check and clean tips.
	4. Check valve on outlet stuck closed.	4. Clean or repair check valve.
	5. Dirt inside pump.	5. Replace pump check valve.
Pump does not develop enough output.	1. Air leaks or clogs on inlet side.	1. Tighten or clean filter bowl assembly.
	2. Electronic box out of adjustment.	2. Refer to box adjustment page.
	3. Pump worn or dirty.	3. Rebuild pump.
	4. Low supply voltage.	4. Check voltage at connection with voltmeter.
	5. Bad gauge.	5. Gauge should read less than 10 PSI when not in use. Also tips should lose spray pattern below 10 PSI. Check accuracy.
Pump output varies.	1. Clogged or restricted inlet.	1. Clean
	2. Worn pump parts.	2. Rebuild pump.
Message light blinks two times	1. Pump or wire harness shorted.	1. Check harness running to pump and verify no shorts or problems. 2. Check to see if pump motor is locked up. Repair or replace.
Message light blinks three times	1. Pump is drawing greater than 10 amps.	1. Check to see if motor is running correctly. Repair or replace.
Message light blinks four times	1. Undercurrent coming to control box.	1. Check all battery connections and connections running up to control box.

Harvest Tec LLC. Warranty and Liability Agreement

Harvest Tec, LLC. will repair or replace components that are found to be defective within 12 months from the date of manufacture. Under no circumstances does this warranty cover any components which in the opinion of Harvest Tec, LLC. have been subjected to negligent use, misuse, alteration, accident, or if repairs have been made with parts other than those manufactured and obtainable from Harvest Tec, LLC.

Our obligation under this warranty is limited to repairing or replacing free of charge to the original purchaser any part that in our judgment shows evidence of defective or improper workmanship, provided the part is returned to Harvest Tec, LLC. within 30 days of the failure. If it is determined that a non-Harvest Tec branded hay preservative has been used inside the Harvest Tec applicator system where the failure occurred, then Harvest Tec reserves the right to deny the warranty request at their discretion. Parts must be returned through the selling dealer and distributor, transportation charges prepaid.

This warranty shall not be interpreted to render Harvest Tec, LLC. liable for injury or damages of any kind, direct, consequential, or contingent, to persons or property. Furthermore, this warranty does not extend to loss of crop, losses caused by delays or any expense prospective profits or for any other reason. Harvest Tec, LLC. shall not be liable for any recovery greater in amount than the cost or repair of defects in workmanship.

There are no warranties, either expressed or implied, of merchantability or fitness for particular purpose intended or fitness for any other reason.

This warranty cannot guarantee that existing conditions beyond the control of Harvest Tec, LLC. will not affect our ability to obtain materials or manufacture necessary replacement parts.

Harvest Tec, LLC. reserves the right to make design changes, improve design, or change specifications, at any time without any contingent obligation to purchasers of machines and parts previously sold.

Revised 6/22

**HARVEST TEC, LLC.
P.O. BOX 63
2821 HARVEY STREET
HUDSON, WI 54016
PHONE: 715-386-9100
1-800-635-7468
FAX: 715-381-1792**